INTRODUCTION

Infrastructure is crucial to the development of any economy. Roads, railways, airways, and waterways enable connectivity with the outside world, facilitate trade and bring prosperity to the region. Advanced modes of transportation allow faster movement of goods and services. Improved connectivity helps in marketing as well as transporting products from the place of production to the market. Advanced infrastructure facilities have also enabled the creation of complex global supply chains. In economics terminology, infrastructure has a high multiplier effect. The Reserve Bank of India (RBI) and the National Institute of Public Finance and Policy estimate the multiplier to be between 2.5 and 3.5. This means that for every rupee spent by the government on infrastructure projects, GDP will increase by Rs. 2.5 to Rs. 3.5. In addition, such a high multiplier suggests that spending by the government on infrastructure leads to crowding in private investment.

Given the key role played by infrastructure, the government must have a planned and coordinated approach. However, due to the multiplicity of departments and the lack of communication and coordination among them, decision-making was fragmented. For instance, after the
construction of a road, government agencies tend to dig up the road again to lay ground cables, gas pipelines, and so on; this not only leads to unnecessary wastage of resources and increased costs but also causes a nuisance to citizens and pollution. Such a scenario could be avoided through coordination among the involved agencies and by issuing all approvals simultaneously before the construction of the road. The lack of proper planning and execution has hampered India's economic growth.

To solve this problem, Prime Minister Narendra Modi instituted PM Gati Shakti – National Master Plan for Multi-modal Connectivity. The plan includes a digital platform under which 16 ministries will be brought together for integrated planning, coordination, and implementation of all the infrastructure projects. The increased connectivity resulting from this scheme will allow faster movement of goods, services, and people using multiple modes of transport which would help save time and cost. This will also allow remote areas to be connected with the rest of India and the world, thereby driving prosperity in these areas. Subsequently, trading activity will increase while inefficiencies and costs will decrease. multiple infrastructure schemes launched by ministries and State Governments such as Sagarmala, Bharatmala, ports, UDAN, inland waterways, etc. will be incorporated into PM Gati Shakti. Also, economic zones such as textile clusters, defence corridors, pharmaceutical clusters, agri-zones, fishing clusters, industrial corridors, and economic corridors will be covered. This will make Indian businesses more competitive and the economy more efficient as well as help in the growth of India's economy.

**INDIAN INFRASTRUCTURE INDUSTRY**

As the infrastructure sector is a key driver of India's economic development, the government is implementing policies and projects for infrastructural development. Recently, the government plans to invest Rs. 1,00,000 crore (US$ 13.1 billion) in infrastructure projects by FY 24–25. The five-year National Infrastructure Plan (NIP) has entered its second year in FY 21, and Rs. 19.5 lakh crore (US$ 2.6 billion). Road transport, urban infrastructure, railways, and energy accounted for approximately 70% of allocation in 2020. The government's commitment to infrastructure is evident from these initiatives. Moreover, this has made the infrastructure sector a lucrative investment option. As per the Department for Promotion of Industry and Internal Trade (DPIIT), 13% of the total FDI inflow in FY 21 was allocated to infrastructure activities. Mordor Intelligence, a market research firm, expects India's infrastructure industry to grow at a compounded growth rate of 7% between 2021 and 2025. Furthermore, India is expected to become the third-largest construction market in the world by 2022.
Some of the key trends in the country's infrastructure industry are given below:

- **Growth in Road Construction:** Roads are an important part of a country's infrastructure. Roads contribute to the lion's share of cargo traffic. About 64% of freight is transported through roads. Furthermore, as India prospers and more people buy vehicles, traffic congestion may increase. The government understands this situation and has, thus, allocated Rs. 1,99,107.71 crore (US$ 26.1 billion) to the Ministry of Road Transport and Highways in the budget for FY 22–23. National highways will be expanded by 25,000 km in 2022–23 under the Gati Shakti plan; 70 km of roads will be built per day, nearly double the 40 km figure set for 2021–22.

- **Expansion of Railways:** While roads dominate cargo movements, they come with certain costs. Road vehicles use petrol and diesel; an increase in fuel usage impacts the environment as well as raises India’s import bill. Furthermore, rising oil prices hurt the economy and drive inflation. Trains are a more efficient means of transporting goods from one place to another. Furthermore, railway transit also helps in reducing traffic congestion. In FY 21, the Indian railways had the highest planned capital expenditure of Rs. 215,058 crore (US$ 28.2 billion). In Budget 2022–23, the Railway Ministry was allocated Rs. 140,367 crore (US$ 18.4 billion), a 16.9% growth over the previous year. Inspired by the One District One Product scheme, the railways will develop a “One Station One Product” scheme. Under this scheme, a product will be selected from each station and promoted. Businesses producing that product will be incentivised. India will also manufacture 400 new Vande Bharat trains by 2025. As these trains are energy efficient, they will help reduce the country’s dependence on imported fuel.

- **Telecom Infrastructure:** The government is focusing on rolling out 5G technology and enhancing broadband services in rural and remote areas. For the same, the government plans to hold a spectrum auction and launch a commercial service in FY 22–23. Furthermore, the government will incentivise laying optic fibre cables in rural areas through a public-private partnership (PPP) initiative. Thus, the government is focusing on increasing connectivity through laying optic fibre as well as on increasing speed through the launch of 5G. The Department of Telecommunication was allocated Rs. 85,586 crore (US$ 11.1 billion); out of this, Rs. 44,720 crore (US$ 5.9 billion) will be allocated to Bharat Sanchar Nigam Ltd. (BSNL) for technology upgradation, 4G spectrum expansion, and restructuring.

**NEED FOR GATI SHAKTI PROGRAMME**

The PM Gati Shakti Yojana aims to address the problems faced by the lack of coordination among the various entities involved in the completion of an infrastructure project. Before the launch of the programme, communication, planning, and execution of infrastructure projects were inefficient due to poor communication and coordination between different departments. These inefficiencies increase the project's cost and lead to wastage of time, raw materials, and other resources that otherwise allocated aptly could increase productivity. The delay in projects also
impacts citizens; the dust and pollution, traffic jams, etc. affect the people living in the vicinity of the construction, reducing the quality of living. There have been instances of one department completing its part of the project but the other department delaying its output or committing some mistakes. This prevents the public from enjoying the benefits of the project. The Gati Shakti programme aims to reduce issues caused by communication lags, which delay the completion of projects, by integrating 16 ministries, including railways and roadways, which are a key part of the infrastructure framework, digitally. This would facilitate decision-making and help in completing the project efficiently in terms of time and cost, as there would be better clarity among departments regarding the decisions and progress made.

Indian goods face tremendous competition from Western goods, in India and globally. Indian goods must keep up with foreign goods in terms of price, quantity, and quality to gain market share. Costs also need to be reduced to gain dominance in terms of price. Businesses incur logistics and supply chain costs that account for 14% of GDP (compared to 8–10% incurred by developing countries), which is a huge disadvantage. In 2018, the World Bank ranked India 44 in its Logistics Performance Index (LPI), a decline from 35 in 2016. The fall in the ranking was primarily attributed to a decline in the quality of infrastructure and degree of timeliness.

The infrastructure gap is a major issue with major logistic providers being restricted to major cities, towns, and areas of special economic significance; however, the micro-industry owners, small and medium enterprises (MSMEs), and agro-businesses in Tier 2 and Tier 3 cities and rural areas have to depend upon the local logistic service providers that may not be as professional and may not provide a pristine service as is available in major cities around the country. India faces issues caused by poor infrastructures such as lack of proper roadways, insufficient seaports, and airports. This makes connectivity between various business stakeholders more difficult, time-consuming, and costly, especially for businesses located in rural areas, which ultimately leads to higher prices for consumers to pay. According to a survey by the Food and Agriculture Organization, the rate of food wastage that occurs before it reaches the Indian consumer is 40%; monetarily, it accounts for a loss of around Rs. 1 lakh crore (US$ 13.1 billion), caused primarily due to poor infrastructure.

The Indian government, through the Gati Shakti Yojana, aims to accelerate the pace of building infrastructure in the country. It plans to construct more roadways providing better connectivity to the hinterland, where a large majority of businesses operate. The government also plans to tackle the issue of logistics by creating a unified logistics interface platform (ULIP) that will help in the efficient transportation of goods. The launch of ULIP will reduce logistics costs.
and time, help in just-in-time inventory management, and eliminate tedious documentation. The Railway Ministry launched the online ‘common drawing approval system’, a single portal for submitting all approval requests; this has helped in reducing the time taken for approvals to 2–3 months from 6 months. These changes will help businesses and citizens travel faster and face lesser delays and problems.

SIX PILLARS OF THE GATI SHAKTI PROGRAMME

The PM Gati Shakti Master Plan is based on six pillars which are mentioned below.

• **Comprehensiveness:** The programme will centralise the plans and initiatives of various stakeholders of the government that are connected to the project, with the help of a centralised portal. The concerned departments will have access to the portal and can monitor the activities and status of other departments with the help of critical data provided. Thus, they can plan accordingly and execute projects more efficiently.

• **Prioritisation:** The availability of cross-sectional interactions helps the different departments integrated into a project to prioritise the project.

• **Optimisation:** The Gati Shakti plan will help in filling up significant gaps that will ultimately improve the planning of the different ministries and agencies involved in the project. For example, when goods are being transported from one place to another, planning the mode of transportation will be critical in the form of deciding the most optimum route in terms of time and cost.

• **Synchronisation:** Often, the interaction among the various departments involved in the project is low. Coordination is needed to reduce delays that occur due to improper planning and implementation. The Gati Shakti programme will help assist in the coordination of the activities of each department across the different layers of the administration, comprehensively by ensuring work coordination between them.

• **Analytical:** The plan will help the agency monitor the status of the project by providing the entire data in one place using GIS-based spatial planning and analytical tools that consist of more than 200 layers.

• **Dynamic:** The GIS platform enables all the ministries and departments to monitor the progress made in cross-sectoral projects. The satellite provided images will give help assess the on-ground progress periodically, and the status of the progress achieved will be updated on the portal regularly. Furthermore, it will aid in the detection of critical interventions for the master plan’s enhancement and updating.

PROJECTS PLANNED UNDER THE PROGRAMME

The PM Gati Shakti Master Plan will focus on fixing major infrastructure and connectivity targets for India by 2024–25. The plan will prioritise the construction of a 2,00,000 km national highway network, including 5,590 km of national highways consisting of 4–6 lanes along the coastal areas; manufacture of trains capable of transporting 1,600 million tonnes of freight; creation of a 35,000 km gas network.
pipeline network by developing a 17,000 km trunk pipeline to connect the industry’s major demand and supply centres; development of 220 airports, airstrips, and aerodromes, including the construction of 109 related facilities; and construction of a 25,000-acre industrial zone with 11 industrial corridors. Additionally, the project aims to connect all state capitals in India’s north-eastern region through highways that have 4–6 lanes and plans to reduce the traffic congestion on the nation’s roads by 51%, through the development of additional lines and the implementation of two dedicated freight corridors. The energy dynamics in the country will also be influenced by the master plan; the transmission network for power lines is expected to expand to 4.52 lakh circuit km and the renewable energy capacity is expected to rise from 87.7 gigawatts (GW) to 225 GW. The projects under the programme are estimated to be completed with a total budget of 1.7 lakh crore (US$ 22.3 billion).

The Mumbai Port Trust is working on several projects to promote multi-modal connectivity, in keeping with the objectives of the programme. Mumbai port’s multi-modal connectivity is built upon cargo-related projects and sea tourism projects. The Mumbai Port Trust has undertaken the following cargo-related projects:

- **Expanding POL Capacity:** The largest crude oil jetty would be constructed at the Marine Oil Terminal. The jetty would have an annual capacity of 22 million tonnes; it would also have pipeline connectivity for evacuation.

- **Bunkering Terminal:** The initiative exploits the benefit of over 5,000 ships that visit Mumbai harbour each year and leverages pipeline connectivity for their evacuation.

- **Facility for Liquified Natural Gas (LNG) Handling:** The project shall deliver up to 5 million tonnes of LNG per annum as clean energy, without straining land-based facilities, as the floating terminal is situated in the sea and the evacuation of LNG will be through pipelines connected through the National Grid.

- **Barging of Containers Between Jawaharlal Nehru Port Trust (JNPT) and Mumbai:** The project aims to transport additional containers from JNPT through waterways, located at a distance of 14 km only. This initiative would help avoid covering the larger distance of 120 km through the road, thereby reducing pollution and traffic congestion.

- **Coastal Facilities:** Indira Dock’s berths 10, 11, and 12 and a shed are dedicated solely for the operation of coastal freight. Furthermore, private companies are erecting temporary silos for bulk cement fly ash on land owned by the Mumbai Port Trust. Expressions of Interest (EOI) have already been invited.

- **Making Railway Connectivity Better:** The improvement of rail connectivity is considered crucial; accordingly, the Mumbai Port is modifying its rail assets on
two fronts. The objective of this project is to strengthen rail connectivity to the dedicated rail freight corridor to Delhi. The port has decided to reorganise and improve the railway network and operations by assigning the railway assets to Indian Port Railway and Ropeway Company Ltd., a dedicated government company. Furthermore, a special rail line is being constructed for the transportation of port freight from Wadala to Kurla. This will enable suburban rails to focus on the Harbour Line, which will assist commuters.

Mumbai Port Trust’s sea tourism projects are given below.

- **International Cruise Terminal:** This is the most important cruise tourism project. The International Cruise Terminal, under development at Ballard Pier Extension Berth, is estimated to cost Rs. 500 crores (US$ 65.5 million). The International Cruise Terminal will be used by cruise ships as well as by city residents. The terminal will consist of retail stores, restaurants, recreational areas, and other amenities, which are usually the choices of entertainment and recreation sought by urban dwellers.

- **Mumbai Port Waterfront at Prince & Victoria Dock Wall:** This integrated water transportation hub will consist of modern necessities for the commute by city dwellers as well as their recreation of city dwellers. The hub will consist of seaside restaurants, an amphitheatre, a Domestic Cruise Terminal, a marina, floating restaurants, harbour cruises, water taxis, and so on. The waterfront will be 1 km long.

- **Ro-Pax Terminal:** Ro-Pax service has been introduced between Mumbai and Mandhwa. It serves as a new form of commuter and tourist transportation connecting the two places. The service, a water transportation mode, will assist in reducing road traffic. The service is expected to be extended to Navi Mumbai airport soon. Ro-Pax service assists commuters using multimodal transportation including roadways and waterways.

- **Ropeway Between Sewree and Elephanta:** The world’s longest ropeway oversea will be constructed under a Public-Private Partnership (PPP); the project is worth Rs. 700 crore (US$ 91.6 million). In addition to providing a beautiful view of marine infrastructure like ships, the Marine Oil Terminal, as well as the upcoming Mumbai Trans Harbour Link, the ropeway will serve as a new mode of transportation for city dwellers.

**GOVERNMENT INITIATIVES INCLUDED UNDER THE PROGRAMME**

The PM Gati Shakti programme incorporates several initiatives launched by ministries and state governments. These initiatives are explained below.

- **Bharatmala:** The government has incorporated the Bharatmala project under the Gati Shakti programme. There are plans to construct 22 greenfield expressways, 23 key infrastructure projects and other highway projects, and 35 Multi-Modal Logistic Parks (MMLPs), which are collectively a part of the Bharatmala project and other schemes of the ministry. The major sections of the project being developed are the Delhi-Mumbai Expressway, Ahmedabad-Dholera Expressway, Bengaluru-Chennai.
Expressway, Hyderabad-VZG Expressway, Delhi-Amritsar-Katra Expressway, Ambala-Kotputli Expressway, Amritsar-Bhatinda-Jamnagar Expressway, UER II, Chennai-Salem Expressway and Chittor-Thatchur Expressway. The Bharatmala project aims to:

- Achieve lane expansion; ease congestion that existing national corridors currently face.
- Connect centres that have significant economic importance (i.e., hubs of production and consumption).
- Develop first-mile and last-mile connectivity and connect different economic corridors.
- Improve the connectivity to coastal areas to establish port-led economic progress and coastal tourism.
- Improve the connectivity to border areas and trading hubs with neighbouring countries such as Nepal, Bhutan, Bangladesh, and Myanmar.
- Establish greenfield expressways According to the Ministry of Road and Transport, the project has made significant progress under the Gati Shakti programme. The ministry also stated that the 35 MMLP projects identified for the development under Bharatmala Pariyojana Phase I are underway.

- **Sagarmala**: Sagarmala is a flagship initiative launched by the Ministry of Ports, Shipping, and Waterways in March 2015 to promote port-led development in India. India has a long coastline measuring 7,500 km and potentially navigable waterways measuring 14,500 km. The country can take advantage of these coastlines and waterways and its strategic location on major maritime trade routes. The programme aims to reduce logistics costs for domestic and international trade with minimum investment in infrastructure. This initiative includes 802 projects worth approximately Rs. 5.53 lakh crore (US$ 72.4 billion). Out of the 802 projects, 172 worth

**Number of Projects Under Sagarmala**

- Completed: 630
- In Progress: 172

**Cost of Projects Under Sagarmala (in US$ billion)**

- Completed: 60.8
- In Progress: 11.6

Source: Sagarmala, Ministry of Ports, Shipping and Waterways
88,235 crores (US$ 11.6 billion) have been completed; the remaining are being implemented. The Sagarmala programme also helps improve the ease of doing business in India, by improving port governance, inland water transport, service digitisation, etc.

- **Inland Waterways:** India has nearly 14,500 km of navigable waterways which include rivers, creeks, backwaters, and canals. More than 70 million tonnes of cargo are moved annually by inland water transport. Furthermore, water transport is fuel-efficient and thus environment-friendly. Despite the advantages of inland water transport, such operations are restricted to some areas of rivers Brahmaputra, Ganga-Bhagirathi-Hooghly, Barak; some rivers in Goad; backwaters in Kerala; waterways in Mumbai; etc. In addition, most of the transportation is undertaken by the informal sector. This indicates that inland waterway transport is significantly underutilised.

Inland waterways are regulated by the Inland Waterways Authority of India (IWAI), which was established in October 1986. IWAI mainly undertakes projects for developing and maintaining inland waterway infrastructure projects. The government is increasingly focusing on inland waterways to develop an integrated transport network system. The organisation aims to increase the modal share of freight movement through inland water transport, from 2% currently to 3%. It also aims to increase the traffic volume to around 120 million tonnes by FY 30. To achieve these objectives, IWAI has announced several e-initiatives.

**Annual Cargo/Traffic Movement on National Waterways (in Million Metric Tonnes)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Cargo/Traffic Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-16</td>
<td>41.5</td>
</tr>
<tr>
<td>2016-17</td>
<td>55.5</td>
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<tr>
<td>2017-18</td>
<td>55.0</td>
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<tr>
<td>2018-19</td>
<td>72.3</td>
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<tr>
<td>2019-20</td>
<td>73.6</td>
</tr>
<tr>
<td>2020-21</td>
<td>83.6</td>
</tr>
</tbody>
</table>

Source: IWAI

- **UDAN:** Air services are another important mode of transportation. These services are especially crucial in linking areas not adequately connected through land routes or regions with difficult terrain, islands, or even areas with security concerns. Furthermore, this mode of transportation provides higher comfort besides reducing the travel time. Thus, it enhances the quality of life. To increase regional air connectivity, the
Ministry of Civil Aviation launched Ude Desh ka Aam Nagrik (UDAN). By providing affordable air travel, UDAN is strengthening the aviation network. The scheme focuses on demand and commercial factors. The scheme aims to reduce operating costs of flights on regional routes; provide a market discovered subsidy for some seats; and a three-year exclusivity period. Airlines have been incentivised to start service across different routes. The scheme involves continuous collaboration and coordination with industry stakeholders such as IAF, Pawan Hans, Air India, airline operators, and the state governments. UDAN has also helped the unserved and underserved airports over three years with a cost of Rs. 4,500 crore (US$ 589.1 million).

Recognising UDAN’s success, states, and union territories are increasingly focusing on air transport and launching similar schemes to help promote air connectivity. Moreover, a scheme was launched under UDAN – Lifeline UDAN – to combat the COVID-19 pandemic. Under this scheme, PPE kits, medicines, medical equipment, ventilators as well as teams of experts were transported to the areas which needed them.

**CONCLUSION**

The Gati Shakti programme is an ambitious initiative launched by the Prime Minister of India to enhance communication between multiple independent government departments and enable them to work in tandem. Under the programme, all the proposed economic zones are mapped along with the multi-modal connectivity infrastructure in a single platform. Future projects by different ministries will be examined and sanctioned in line with the entire plan. In addition, the plan would utilise new IT tools and modern technology to increase coordination in infrastructure planning. For instance, the plan will make use of satellite imagery with the Indian Space Research Organisation (ISRO), for monitoring projects, where the imagery is developed by the Bhaskaracharya National Institute for Space Applications and Geoinformatics (BiSAG-N). In short, planning, designing, implementing, and monitoring infrastructure projects, which were earlier conducted separately in departmental silos, will now be conducted by focusing on a common vision. This would enable the synchronisation of efforts. Subsequently, the Indian economy would be able to realise synergistic benefits.

Achieving seamless and integrated multi-modal transportation is difficult. Thus, properly implementing the Gati Shakti programme and adhering to it will remain crucial to its success. Multi-modal transportation will enhance connectivity and enable faster and more efficient movement of people, goods, and services. In addition, the multiple projects planned will create several employment opportunities. The disclosures related to upcoming infrastructure connectivity projects, business hubs, industrial areas, and so on would help investors and businesses set up operations at specific locations to benefit from such projects. Furthermore, this will lead to more resilient supply chains, reduce costs and improve the overall business competitiveness. This will provide a boost to India’s economy and help India become a global manufacturing hub.